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The
SMALL WATERSHED PROGRAM



IN NEW MEXICO

JULY 1, 1967

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALBUQUERQUE, NEW MEXICO

NATIONAL

AGRICULTURAL

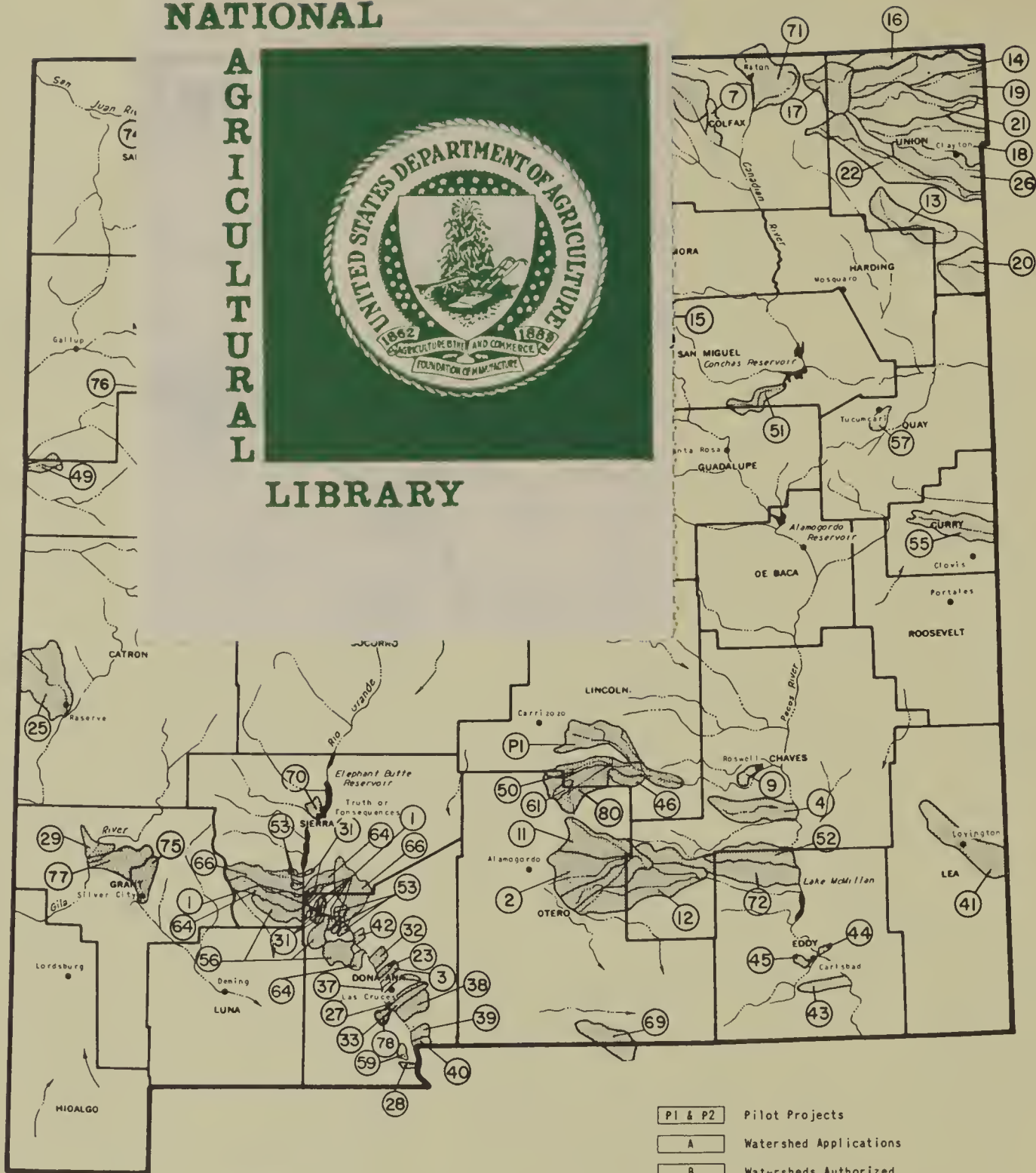


LIBRARY

LEGEND

P1 Upper Rio Hondo Tribs. (Pilot) E
P2 Sandio Mountain Tribs. (Pilot) E
P.L. 566 WATERSHEDS

No.	Watershed	Status
1.	Hatch Valley Arroyos	E
2.	Upper Rio Penasco	E
3.	Dona Ana Arroyo	E
4.	Zuber Draw	E
5.	Pojoaque Creek	C
6.	Santa Cruz River	E
7.	Saltwater Creek	E
8.	Arroyo Grande	A
9.	North Spring River	A
10.	Bloomfield Arroyo	C
11.	Middle Rio Penasco	A
12.	Lower Rio Penasco	A
13.	Tramperas Creek	E
14.	South Dry Cimarron	C
15.	Pecos Arroyo	E
16.	North Dry Cimarron	C
17.	Upper Dry Cimarron	C
18.	Cieneguilla Creek	A
19.	Carriazo Creek	A
20.	Monio Creek	A
21.	Corrumpa Creek	A
22.	Carriazo Creek	A
23.	Alvillar Arroyos	A
24.	Prap Canyon & Tribs.	E
25.	Upper Frisco	C
26.	Perico Creek	A
27.	Tortugas Arroyo	E
28.	Turley Deerman Arroyo	A
29.	Upper Gila Valley Arroyos No. I	E
30.	Upper Mora River	A
31.	Caballo Arroyos	E
32.	Leasburg Arroyos	A
33.	Fillmore Arroyos	E
34.	San Mateo-Grants Canyon	A
35.	Belen-Las Lunas	A
36.	Lemitar-Polvadera	C
37.	North Alameda Arroyo	A
38.	Apache-Brazito Mesquite	E
39.	Lauson Breedlove	B
40.	Anthony Arroyo	D
41.	Central Lea	A
42.	Gary-Winder-Haynor Arroyos	A
43.	Cass Draw	D
44.	Avolon-Alocran	D
45.	Hackberry Draw	D
46.	Alamo Canyon	A
47.	Sebastian Martin-Block Mesa	B
48.	Pajarito Arroyos	A
49.	Ojo Caliente	A
50.	Eagle Creek	C
51.	Garita Creek	A
52.	Cottonwood-Walnut Creek	B
53.	Upper Valley Arroyos	A
54.	Corrales Arroyos	B
55.	Running Water Draw (Tex.)	B
56.	Crow and Broad Canyon and Plocitas Arroyo	B
57.	Tucumcari Draw	B
58.	Toos Creek-(Applic. withdrawn)	A
59.	La Union Arroyos	A
60.	Embudo River	A
61.	Corriazo Creek	A
62.	Sandios Watershed Project	A
63.	Pole-Zuni Canyons	A
64.	Sibley, Green, Jaralosa and Candler Arroyos	B
65.	Little Rio Grande	A
66.	Trujillo, Montoya, Tiorro Blanco and Rincon Arroyos	B
67.	Espanola-Rio Choma	A



68.	San Cristobal	A
69.	Cornudas-North Draws (Tex.)	A
70.	T or C - Williamsburg	B
71.	Chico Rico	A
72.	Eagle-Tumbleweed Draws	B
73.	Vermejo River	A
74.	Hammond Conservancy Dist	A
75.	Silver City Watershed	A
76.	Rio San Jose	A
77.	Bear Creek	A
78.	San Miguel Arroyos	A
79.	Hampton, Aztec, School, Williams and Estes Arroyos	A
80.	Ruidoso	A
81.	Gallinas River	A

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CATALOGING

WATERSHED PROTECTION PROJECTS IN NEW MEXICO

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Albuquerque, New Mexico

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Revised 7-67

THE WATERSHED PROTECTION AND FLOOD PREVENTION PROGRAM

The Watershed Protection and Flood Prevention Act (Public Law 566) was passed by Congress in 1954. This Act followed by one year the authorization by Congress of work on approximately 60 small watersheds to serve as demonstration or "pilot" projects. Two of these pilot projects are in New Mexico. Construction on both projects has been completed.

The Watershed Protection and Flood Prevention Act provides authority to the Secretary of Agriculture to give technical, financial and credit assistance to local organizations in planning and carrying out watershed projects. Within the Department of Agriculture this program is administered by the Soil Conservation Service. In New Mexico the State Engineer has been designated by the Governor as the State agency responsible for this program. All applications for watershed projects are submitted to the State Engineer and must be approved by him prior to acceptance by the Soil Conservation Service. The State Engineer also determines the priority of application to receive planning assistance, reviews and approves the projects work plan, and issues construction permits for necessary structural works.

The Act provides for a project type approach to soil and water resource development, use, and conservation, with initiative and control in the hands of local organizations composed of people within the watershed area. Applications may be submitted for a watershed project by local qualified organizations having authority under State law to construct, maintain, and operate works of improvement, or by a group of two or more such local organizations having combined authority under State law to carry out these responsibilities for the project. As a prerequisite to planning, it is required that at least one of the sponsoring organizations have the power to levy assessments and the power of eminent domain.

To facilitate the watershed program in areas where there are no local organizations with the necessary powers, the New Mexico State Legislature passed the Watershed District Act (House Bill 161) in 1957. This Act authorizes and provides procedures for establishing watershed districts which are qualified to carry out the required local responsibilities in connection with works of improvement for watershed protection and flood prevention.

Each watershed project will provide for proper land use and treatment in the interest of soil and water conservation, as well as other purposes such as flood prevention, irrigation, drainage, fish and wildlife development, municipal water supply, or other phases of water management. Needed land treatment measures must be included in the project as a condition to Federal assistance. The objectives and desires of the local organization are a controlling factor in planning for other works of improvement.

LOCAL RESPONSIBILITIES

Since watershed projects are local in nature, public assistance is provided to help the local people carry out projects requiring group action beyond their individual capabilities. To be eligible for this assistance,

the local people and their organizations are responsible for the following actions:

1. Inform local people of the program to insure that concerned landowners understand the need and opportunities under the program and that local people will provide support for the project.
2. Prepare and submit the application for assistance. Leadership in preparing and submitting the application is usually provided by the supervisors of the local soil and water conservation district.
3. Take the lead in developing a plan for the project with assistance from the Soil Conservation Service and other appropriate agencies.
4. Provide land, easements and rights-of-way for all structural works of improvement.
5. Plan and establish conservation measures on private land. At least 50% of the land area above each structure must be under the conservation agreement with the local soil and water conservation district.
6. Provide contractual services during construction.
7. Pay the allocated share of costs for measures for agricultural water management, fish and wildlife development and recreation.
8. Provide all necessary water rights and permits to store water where applicable.
9. Operate and maintain all structures built as part of the project and maintain conservation measures installed on private land.
10. Pay all of the cost of water storage allocated to municipal and industrial use.

FEDERAL RESPONSIBILITIES

1. The Soil Conservation Service provides technical help in planning and establishing a watershed protection and flood prevention project with assistance from participating Federal and State agencies.
2. The Soil Conservation Service pays all construction and installation costs chargeable to flood prevention.
3. The Soil Conservation Service pays the allocated share of construction costs and provides all necessary installation services such as detailed plans and designs, and supervision of construction for measures for agricultural water management, fish and wildlife development and recreation.
4. For measures for recreation, in addition to providing 50% of the construction cost and all installation services, the Soil Conservation

Service may pay a share of the cost for easements and rights-of-way, access roads, and minimum basic facilities.

5. Through soil conservation districts, provides technical assistance in conservation farm planning and application, and in maintenance of land treatment and structural measures.
6. Loans are available to qualified local organizations through the Farmers Home Administration to carry out watershed project purposes.

PROGRESS IN THE WATERSHED PROGRAM IN NEW MEXICO

The farmers, ranchers, communities, towns, villages, counties, State agencies, and special purpose districts of New Mexico have recognized the Small Watershed Program as a means of solving many of their problems of conservation, watershed protection, and flood prevention. During fiscal year 1967 applications for assistance were submitted for 2 watersheds totalling 320,261 acres. On June 30, 1967 a total of 81 applications covering 7,388,180 acres had been received and approved by the New Mexico State Engineer and the Administrator of the Soil Conservation Service since the inception of the program. As of that date 37 watersheds have been authorized for work plan development, 19 have been authorized for construction and 14 projects have been completed.

Applications have been submitted on watershed projects in 26 of the 32 counties in New Mexico. Out of the 55 soil and water conservation districts in the State, 34 have sponsored watershed applications. Other sponsors include towns and cities, county commissions, irrigation districts, conservancy districts, watershed districts, State agencies, and Indian Tribal Councils.

WATERSHED PLANNING

Since 1963 the State of New Mexico provided funds through State agencies to accelerate watershed project planning within the State. The International Boundary and Water Commission has also provided funds to the Soil Conservation Service for work plan development on selected watersheds in Dona Ana and Sierra Counties. The additional funds from these two sources have doubled the development rate for watershed work plans in New Mexico. It is beginning to have a significant effect on the number of projects authorized for construction.

The priority of watersheds to receive assistance in work plan development is determined jointly by the New Mexico State Engineer and the Soil Conservation Service. The State Soil Conservation Committee acts as an advisor to the State Engineer in determining priorities for planning. The priority recommendations are based on consideration of all remaining watershed applications that meet the requirements of the law and the policy of the Department of Agriculture. Significant factors include economic and physical feasibility of the project, the amount of needed land treatment measures which have been installed on the land, the interest of local people and their willingness and ability to assume their responsibilities, the extent to which the proposed project meets all of the needs of the watershed, and the number of landowners benefited. In addition to

conservation land use and treatment, all watershed projects must have either flood prevention or agricultural water management as a primary project purpose. Projects cannot be approved for planning unless at least one of the sponsoring local organizations has the power of eminent domain and agrees to use these powers to carry out local responsibilities under the watershed program.

During fiscal year 1967 assistance in work plan development was provided on 10 watershed applications.

WATERSHED CONSTRUCTION

A total of 19 watersheds have been approved for operations and construction has been completed on 14 projects. Construction was carried out on one project during the year.

PROJECTS AUTHORIZED FOR INSTALLATION UNDER THE PILOT WATERSHED ACT

PROJECTS COMPLETED

1. Sandia Mountain Tributaries Watershed
2. Upper Rio Hondo Watershed

PROJECTS AUTHORIZED FOR INSTALLATION UNDER PUBLIC LAW 566

PROJECT CONSTRUCTION COMPLETED

1. Dona Ana Arroyos
2. Hatch Valley Arroyos
3. Caballo Arroyos
4. Upper Rio Penasco
5. Zuber Draw
6. Tramperos Creek
7. Prop Canyon and Tributaries
8. Santa Cruz River
9. Fillmore Arroyos
10. Tortugas Arroyo
11. Upper Gila Valley Arroyos No. 1
12. Saltpeter Creek
13. Pecos Arroyo
14. Apache-Brazito-Mesquite Arroyos

PROJECTS APPROVED FOR INSTALLATION

1. Hackberry Draw
2. Avalon-Alacran
3. Cass Draw
4. Anthony Arroyo
5. Crow and Broad Canyons and Placitas Arroyo

PROJECTS BEING PLANNED UNDER PUBLIC LAW 566

1. Sibley, Green, Jaralosa and Candler Arroyos
2. Corrales
3. Running Water Draw
4. Sebastian Martin-Black Mesa
5. Tucumcari Draw
6. Lauson-Breedlove Arroyos
7. Cottonwood-Walnut Creeks
8. Trujillo, Montoya, Tierra Blanca and Rincon Arroyos
9. Eagle-Tumbleweed Draws
10. Truth or Consequences-Williamsburg Arroyos

PILOT WATERSHED PROJECTS

PROJECTS COMPLETED

PROJECTS AUTHORIZED FOR INSTALLATION
UNDER THE PILOT WATERSHED ACT

PROJECTS COMPLETED

SANDIA MOUNTAIN TRIBUTARIES WATERSHED

LOCATION

Sandoval County in the vicinity of Bernalillo. Rio Grande basin in north-central New Mexico.

STRUCTURAL MEASURES

One Floodwater retarding structure with a total detention capacity of 320 acre-feet.

SIZE

9,050 acres

COSTS AND BENEFITS

Total installation cost \$160,364.
Average annual cost is \$5,600.
Average annual benefits \$8,900.
The ratio of average annual benefits to average annual cost is 1.6:1.

SPONSORS

Santa Fe-Sandoval Soil Conservation District.

STATUS

PROBLEMS

Floodwater and sediment damage to irrigated cropland, irrigation canals and drains, highways, roads, streets and urban property.

Project authorized August 1953.
Construction completed August 1955 at a cost of \$39,219. Project completed in 1956.

LAND TREATMENT

Most of the upland area in Cibola National Forest. Practices include range proper use, erosion control structures, range seeding, fencing, contour furrowing and other measures to retard flood runoff and reduce sediment yield.

PROJECTS COMPLETED

UPPER RIO HONDO WATERSHED

LOCATION

Lincoln County. Includes parts of Rio Ruidoso, Rio Bonito and Rio Hondo. Tributary to Pecos River.

SIZE

256,000 acres

SPONSORS

Upper Hondo Soil and Water Conservation District.

PROBLEMS

Floodwater and sediment damage to cropland, irrigation facilities, and roads. Contributes to flood damage in Roswell.

LAND TREATMENT

Streambank stabilization, land leveling, range seeding, brush control, erosion control structures, range proper use, contour furrowing, water developments, and other measures to reduce erosion, runoff and sediment yield

STRUCTURAL MEASURES

One floodwater retarding structure, 44 stabilization and sediment control structures, 9 debris basins, and 1.22 miles of stream channel improvement. Cost \$401,048.

COSTS AND BENEFITS

Total project cost \$989,063. Federal cost \$647,759. Ratio of average annual cost \$55,470 to average annual benefits \$114,120 is 2.1:1.

STATUS

Project completed May 1960.

COMPLETED WATERSHED PROJECTS

PROJECTS AUTHORIZED FOR INSTALLATION UNDER
P. L. 566

PROJECTS COMPLETED

DONA ANA ARROYO WATERSHED

LOCATION

Tributary to the Rio Grande in Dona Ana County. Situated on the east side of the Rio Grande Valley at the community of Dona Ana about 5 miles north of Las Cruces.

SIZE

6,950

SPONSOR

Elephant Butte Irrigation District

PROBLEMS

Dona Ana Arroyo and North Fork Arroyo terminate at the Dona Ana Lateral. Floodwaters wash out the Lateral and cause damage to 700 acres of irrigated cropland. Sediment is deposited on irrigated cropland and in irrigation canal.

LAND TREATMENT

Because of environmental conditions in this location, range proper use to allow for maximum vegetative recovery is the only measure planned for the upland portion of the watershed. Land treatment measures for the irrigated land was not included in the plan.

STRUCTURAL MEASURES

Structural measures include 2 floodwater retarding structures, a diversion to divert flows of North Fork Arroyo into Site 2, 5,182 feet of outlet channel and 5 grade stabilization structures. The structures are designed to fully control the 50-year frequency flood. Total capacity is 735 acre-feet. The structures contain 258,868 cubic yards of earth fill. Construction cost \$160,095. Total P. L. 566 cost \$167,859.

COSTS AND BENEFITS

Total estimated installation cost of the project is \$173,667. Average annual cost of \$9,129 compared with estimated average annual benefits of \$17,512 gives a benefit-cost ratio of 1.9:1. Average annual damages will be reduced by 79 percent.

STATUS

The structural measures were completed in February 1958. This was the first project in New Mexico to be completed under the authority of Public Law 566.

PROJECT BENEFITS

Five small floods have been reported on this project since completion. Estimated flood prevention benefits of structural measures for these floods was \$7,310.

PROJECTS COMPLETED

HATCH VALLEY ARROYOS WATERSHED

LOCATION

The project includes six arroyos tributary to the Rio Grande in Dona Ana and Sierra Counties in southeastern New Mexico. The project is in the vicinity of Hatch.

SIZE

14,521 acres

SPONSOR

Caballo Soil Conservation District

PROBLEMS

The six arroyos do not have channels to the Rio Grande and flood runoff causes damage to irrigated cropland and irrigation facilities about once every four years.

LAND TREATMENT

All of the cropland is under agreement with the Caballo Soil Conservation District and a high degree of needed conservation measures has been applied. Range proper use is the only measure to be applied to the upland area. Treatment measures for the irrigated cropland was not included in the plan.

STRUCTURAL MEASURES

Structural measures include 6 floodwater retarding structures with a total capacity of 1,094 acre-feet. To dispose of principal spillway discharge, 6,800 feet of channel and 3 grade stabilization measures were built. The structures will fully control the 50-year frequency flood runoff. Total capacity is 1,094 acre-feet and total earth fill is 327,173 cubic yards. Actual construction cost \$227,861. Total P. L. 566 cost \$279,920.

COSTS AND BENEFITS

Total estimated installation cost was \$184,985. Average annual cost was \$8,561 and average annual benefits were \$15,691. This yields a benefit-cost ratio of 1.8:1. Actual construction cost \$228,081. Average annual damages will be reduced by 79 percent.

STATUS

The project was authorized for installation in June, 1956 and construction was completed in September of 1958.

PROJECT BENEFITS

Five floods have occurred on one or more of the arroyos controlled by structural measures since construction was completed. Floods were reported in 1957, 1958, 1961, 1965 and 1966. Estimated flood prevention benefits from structural measures to date is \$76,750.

PROJECTS COMPLETED

CABALLO ARROYOS WATERSHED

LOCATION

The project includes 5 arroyos in southwestern New Mexico. The arroyos are tributary to the Rio Grande in the vicinity of Hatch.

SIZE

7,680 acres

SPONSOR

Caballo Soil Conservation District.

PROBLEMS

Flood flows from these arroyos cause some damage to the 700 acres of irrigated cropland every year. A total of 1,242 acres of land is subject to damage. Sediment deposited in irrigation canals and on cropland necessitates removal from canals and ditches and releveling of cropland.

LAND TREATMENT

All of the cropland is under agreement with the Caballo Soil Conservation District and a high degree of needed conservation measures have been installed. A high percentage of the rangeland is Federal land. The only treatment proposed for these lands is range proper use. Treatment measures for the irrigated land was not included in the plan.

STRUCTURAL MEASURES

Five floodwater retarding structures, 5,920 feet of floodwater diversion, 13,495 feet of channel and 3 stabilization structures were built. The structures are designed to be fully effective for 50 years. Total floodwater and sediment capacity is 802 acre-feet and the structures contain 213,530 cubic yards of earth fill. Actual construction cost was \$164,966. Total P. L. 566 cost \$223,144.

COSTS AND BENEFITS

Total estimated project costs were \$286,443. The estimated average annual cost of structural measures is \$11,509, and the average annual benefits are \$13,799. Benefit-cost ratio is 1.2:1. The project will reduce overall flood damages by 98 percent.

STATUS

The project was approved for installation in May, 1958. Construction was completed in September, 1960.

PROJECT BENEFITS

Two floods have been reported on one or more of the arroyos controlled by structural measures since construction was completed. Estimated flood prevention benefits from structural measures to date is \$17,825.

PROJECTS COMPLETED

UPPER RIO PENASCO WATERSHED

LOCATION

Located in Otero County and includes the upper reaches of the Rio Penasco. The Rio Penasco rises at the crest of the Sacramento Mountains and flows eastward 80 miles to its confluence with the Pecos River.

SIZE

128,000 acres.

PROBLEMS

Summer thunderstorms cause some damages almost every year. The Allen Canyon forest fire in 1951 swept across a portion of the watershed and destroyed almost all of the protective vegetation. Slopes in the burned area are steep and rocky averaging 35 to 40 percent. The area covered by the fire, although comprising a small percentage of the total watershed area, is the source of most of the damaging floods.

LAND TREATMENT

Eighty percent of the land is Federal land administered by the Forest Service. Treatment of these lands to reduce runoff and sediment yield will be concentrated in the Allen burn area. There are 100 farm and ranch units in the watershed. Treatment of these lands will be carried out at a cost of \$43,500.

STRUCTURAL MEASURES

Although the 3 floodwater retarding structures will control the runoff from only about 8 percent of the watershed, they will reduce the floodwater damage by 60 percent. **Estimated total cost of structural measures is \$145,237.** The structures are designed to be fully effective for 50 years. Total floodwater and sediment capacity is 478 acre-feet. The structures contain 178,335 cubic yards of earth fill. Actual construction cost was \$133,565. Total P. L. 566 cost \$198,963.

COSTS AND BENEFITS

Total estimated cost of the project is \$358,737. The estimated average annual cost of structural measures is \$5,683 and the average annual benefit is \$8,325. The project will reduce the overall average annual damages by 70 percent. The benefit-cost ratio is 1.5:1.

STATUS

The project was approved for installation in June 1957 and construction was completed in November, 1960.

PROJECTS COMPLETED

ZUBER DRAW WATERSHED

LOCATION

The Zuber Draw Watershed includes Zuber, Thirteen Mile and Greenfield Draws immediately west of the town of Dexter in Chaves County. The watershed is tributary to the Pecos River but none of the draws have defined outlets to the river.

SIZE

115,840 acres.

SPONSORS

Hagerman-Dexter, Roswell and Upper Hondo Soil Conservation Districts and the Zuber Draw Watershed District.

PROBLEMS

Floodwaters from the 3 draws are discharged on the alluvial plain on which 15,059 acres of irrigated cropland are situated. Damages are principally to crops. Significant damages occur every 2 or 3 years.

LAND TREATMENT

There are 65 irrigated farms and 16 ranches located in the watershed. Emphasis on land treatment on those measures which would have a measurable effect on the reduction of floodwater and sediment damage. Other measures were installed on irrigated land. Total cost for installing land treatment was estimated at \$139,108.

STRUCTURAL MEASURES

Three floodwater retarding structures and 11.2 miles of diversion were built. The structures will control the runoff resulting from a 50-year frequency storm. Total estimated cost of installing the structural measures is \$365,196. The structures are designed to be fully effective for 50 years. Total floodwater and sediment capacity is 4,954 acre-feet. The structures contain 627,400 cubic yards of earth fill. Actual construction cost was \$282,060. Total P. L. 566 cost \$370,919.

COSTS AND BENEFITS

Total estimated project cost is \$523,688. Average annual cost of structural measures is \$17,433 and the average annual benefits are \$23,226. The ratio of average annual benefits to average annual cost is 1.3 to 1. The program will reduce average annual flood damages by 87 percent.

STATUS

The project was approved for installation in July, 1958 and construction was completed in March, 1961.

PROJECTS COMPLETED

TRAMPEROS CREEK WATERSHED

LOCATION

Union and Harding County in northeastern New Mexico. Tributary to Major Longs Creek, a tributary to the Canadian River.

SIZE

136,320 acres.

SPONSORS

Ute Creek and Northeastern Soil Conservation Districts and Tramperos Creek Watershed District.

PROBLEMS

Flood damage on flood plain of Tramperos Creek and minor damage on tributaries. Major damage is sediment deposition on crops and meadows. Damage to fences, roads, crops and livestock.

LAND TREATMENT

Emphasis on measures to reduce floodwaters and sediment damage and prevent accelerated erosion. All land is privately owned and estimated cost of installing treatment measures in the 5-year installation period is \$140,994.

STRUCTURAL MEASURES

Two floodwater retarding structures with a combined detention capacity of 6,282 acre-feet. 409,570 cubic yards earth fill. Estimated cost of installing structural measures \$346,355. Actual construction cost \$194,052. Total P. L. 566 cost \$249,556.

COSTS AND BENEFITS

Total estimated projects costs \$487,349. Estimated overall damage reduction 84 percent. Average annual cost \$12,962. Average annual benefits \$14,578. Ratio of average annual benefits to average annual cost 1.1:1. Actual construction cost \$193,931.

STATUS

Approved for construction July, 1958. Construction completed March, 1961.

PROJECT BENEFITS

Two floods occurred on the watershed in 1965. Estimated floodwater reduction benefits of the structural measures for these two floods was \$105,000.

PROJECTS COMPLETED

PROP CANYON AND TRIBUTARIES WATERSHED

LOCATION

Northeastern New Mexico in the vicinity of Bluewater. Tributary to Bluewater Creek, a tributary of the Rio Grande.

SIZE

19,162 acres.

SPONSOR

Bluewater Soil Conservation District.

PROBLEMS

Three arroyos, origination to the west and southwest of Bluewater, discharge floodwaters into the village and onto adjacent irrigated cropland. The highline canal of the Bluewater-Toltec Irrigation Company is frequently damaged.

LAND TREATMENT

Emphasis will be on measures to improve vegetative cover on rangeland. Practices to be established include range proper use, range seeding, and erosion control structures on private land and similar practices on the National Forest. Total estimated cost for land treatment measures is \$56,550.

STRUCTURAL MEASURES

Two floodwater retarding structures, 15,345 feet of diversion, 5,882 feet of outlet channel and two irrigation ditch crossings were planned. Estimated total costs of structural measures is \$161,298. The structures are designed to be fully effective for 50 years. Total floodwater and sediment capacity is 698 acre-feet. The structures contain 147,727 cubic yards of earth embankment. Actual construction cost \$82,902. Total P. L. 566 cost \$125,960.

COSTS AND BENEFITS

Total estimated cost of the project is \$217,848. The program will reduce overall damages by 91 percent. The structures will control flood runoff from a 50-year frequency storm. The average annual cost of the structural measures is \$8,140 and average annual benefits are \$10,198. The ratio of average annual cost to average annual benefits is 1.3:1.

STATUS

The project was approved for operations in October, 1958 and construction was completed in September, 1961.

PROJECTS COMPLETED

SANTA CRUZ RIVER WATERSHED

LOCATION

North-central New Mexico. Santa Fe, Rio Arriba and Mora Counties. Tributary to the Rio Grande.

SIZE

117,180 acres.

SPONSORS

Pojoaque-Santa Cruz and Espanola Valley Soil Conservation Districts, and Santa Cruz Irrigation District.

PROBLEMS

Flood and sediment damage resulting from flows from arroyos entering Santa Cruz River. Sediment damage to Santa Cruz Reservoir.

LAND TREATMENT

Emphasis on measures which have a measurable effect on reduction of floodwater and sediment damages. Range proper use, brush control, fencing, range seeding and erosion control. Land treatment costs - private land \$18,400, B. L. M. - \$10,770, Forest Service - \$40,776. Total \$69,946.

STRUCTURAL MEASURES

Six floodwater retarding structures, 1,143 feet floodwater diversion. Three debris basins installed by B. L. M. Total estimated cost of structural measures \$452,277. The structures are designed to be fully effective for 50 years. Total floodwater and sediment capacity of the retarding structures is 1,702 acre-feet. The structures contain 581,438 cubic yards of embankment. Actual construction cost \$373,676. Total P. L. 566 cost \$455,421.

COSTS AND BENEFITS

Estimated total project cost \$522,223. Structural measures and land treatment will reduce floodwater damages by 51 percent. Average annual cost of structural measures is \$17,813 and average annual benefits are \$22,038. Ratio of average annual benefits to average annual cost is 1.2:1.

STATUS

Approved for operation August, 1959. Construction completed September, 1962.

PROJECTS COMPLETED

FILLMORE ARROYOS WATERSHED

LOCATION

Originates in the southern portion of the Organ Mountains and flows westward to the flood plain of the Rio Grande about 5 miles south of Las Cruces.

SIZE

16,292 acres.

SPONSOR

Elephant Butte Irrigation District.

PROBLEMS

Flood damage to irrigated cropland, irrigation and drainage systems, farm improvements and public roads.

LAND TREATMENT

Management of range lands to allow for maximum vegetative recovery under environmental conditions existing in this locality will allow vegetation to make its maximum contribution in reducing erosion and sediment yield. Treatment measures for irrigated land were not included in the plan.

STRUCTURAL MEASURES

Three floodwater retarding structures with a combined total detention capacity of 1,282 acre-feet, 4,300 feet of dike, 5,824 feet of outlet channel, and 3 grade stabilization structures. The structures contain 378,705 cubic yards of earth embankment. Actual construction cost \$173,384. Total P. L. 566 cost \$206,342.

COSTS AND BENEFITS

Total estimated installation cost of structural measures \$280,021. Structural measures will reduce flood damages by 93 percent. Average annual cost \$11,234. Average annual benefits \$12,937. Ratio of average annual benefits to average annual cost is 1.2:1.

STATUS

Approved for operations March, 1961. Project completed October, 1962.

PROJECT BENEFITS

Floods were reported on the watershed in 1963 and 1965. Estimated floodwater reduction benefits of the structural measures is \$10,325.

PROJECTS COMPLETED

TORTUGAS ARROYO WATERSHED

LOCATION

Originates near the crest of the Organ Mountains and flows westward to the flood plain of the Rio Grande just south of Las Cruces in Dona Ana County.

SIZE

15,584 acres.

SPONSOR

Elephant Butte Irrigation District

PROBLEMS

Approximately 25 damaging floods have occurred within the past 20 years. Damage to crops, cropland, highways, a railroad and irrigation canals.

LAND TREATMENT

Range proper use is the only land treatment measure. This practice will allow for maximum vegetative recovery under environmental conditions existing in this locality and will make its maximum contribution in reducing erosion and sediment yield. Treatment measures for the irrigated land were not included in the plan.

STRUCTURAL MEASURES

Two floodwater retarding structures, 428 feet of diversion, 2,929 feet of outlet channel and 2 grade stabilization structures. Total estimated cost \$342,641. The structures will control the 50-year flood event and will be fully effective for 50 years. Total floodwater and sediment capacity is 1,326 acre-feet. The structures contain 402,700 cubic yards of earth embankment. Actual construction cost \$171,071. Total P. L. 566 cost \$209,028.

COSTS AND BENEFITS

Total project cost \$342,641. Structural measures will reduce damage by 95 percent. Average annual cost of structural measures \$13,393. Average annual benefits \$15,757. Ratio of average benefits to average annual cost is 1.2:1.

STATUS

Approved for operations April, 1961. Construction completed November, 1962.

PROJECT BENEFITS

Floods were reported in 1962, 1965 and 1966. Estimated floodwater reduction benefits of the structural measures to date is \$44,800.

PROJECTS COMPLETED

UPPER GILA VALLEY ARROYOS WATERSHED NO. 1

LOCATION

Grant County, southwestern New Mexico in vicinity of villages of Cliff and Gila. Includes arroyos on both sides of the Gila River.

SIZE

27,000 acres.

SPONSORS

Grant Soil Conservation District, Upper Gila Watershed District.

PROBLEMS

Floodwater and sediment damage to irrigated cropland, irrigation systems, levees, dikes and roads.

LAND TREATMENT

Range proper use will result in improved vegetative cover within climatic limitations. Additional land treatment measures on upland areas not feasible. Treatment measures on irrigated land not included in the plan.

STRUCTURAL MEASURES

Twelve floodwater retarding structures, 1,107 feet outlet channels, 1,230 feet of dikes, 11 grade stabilization structures. Eleven of the structures will contain the 50-year flood event and 1 will contain the 25-year flood. Total capacity for floodwater and sediment is 1,828 acre-feet. The structures contain 401,416 cubic yards of earth embankment. Actual construction cost \$299,897. Total P. L. 566 cost \$417,005.

COSTS AND BENEFITS

Estimated total project cost \$353,462. Flood damages will be reduced by 90 percent. The ratio of average annual benefits \$15,912 to average annual costs \$14,011 is 1.1:1.

STATUS

Authorized for installation August 1960. Construction completed March 1963.

PROJECT BENEFITS

Floods were reported in 1963, 1964 and 1966. Estimated floodwater reduction benefits of the structural measures to date is \$17,350.

PROJECTS COMPLETED

SALTPETER CREEK WATERSHED

LOCATION

Colfax County in northeastern New Mexico. Northwest of village of Maxwell. Tributary to Vermejo River, a tributary of the Canadian River.

SIZE

32,320 acres.

SPONSOR

Eastern Colfax Soil Conservation District. Vermejo Conservancy District.

PROBLEMS

Floodwater damage to road and irrigation canal. Deposition of sediment in irrigation canals and off channel irrigation reservoirs is the major problem.

LAND TREATMENT

Range proper use supplemented by contour furrows, pitting, check dams, diversions and ponds.

STRUCTURAL MEASURES

One floodwater retarding structure. Estimated installation cost \$212,141. Total floodwater and sediment capacity is 1,558 acre-feet and the structure contains 200,500 cubic yards of earth embankment. Actual construction cost \$197,880. Total P. L. 566 cost \$280,540.

COSTS AND BENEFITS

Estimated total project cost \$257,631. Ratio of average annual benefits \$6,775 to average annual cost \$6,369 is 1.1:1. Average annual damages will be reduced by 69 percent.

STATUS

Authorized for installation April, 1959. Construction completed June, 1964.

PROJECT BENEFITS

A major flood occurred on the watershed in June, 1965. Estimated floodwater reduction benefits of the structure were \$206,500. Benefits one year after completion of the structure exceeded the construction cost of the structure.

PROJECTS COMPLETED

APACHE-BRAZITO-MESQUITE WATERSHED

LOCATION

Dona Ana County, 7 to 13 miles south of Las Cruces. Tributary to the Rio Grande, but no through channel to the river.

SIZE

39,660 acres.

SPONSOR

Elephant Butte Irrigation District.

PROBLEMS

Floodwater and sediment damage to irrigated cropland, Interstate Highway 10, irrigation canals and laterals, drainage canals, and county and farm roads.

LAND TREATMENT

57 percent of rangeland administered by Bureau of Land Management. Treatment on range land will consist of range proper use. Measures to be installed on irrigated land include irrigation water management, land leveling, ditch lining and irrigation structures for field ditches. Estimated cost for installing land treatment is \$270,670.

STRUCTURAL MEASURES

Four floodwater retarding structures, 5,421 feet of outlet channels, 5,484 feet of diversions, 3,000 feet of dike and 8 grade stabilization structures. Estimated installation cost \$662,591. The structures will fully control the 50-year flood event and will have a total floodwater and sediment capacity of 3,343 acre-feet. The structures contain 924,911 cubic yards of earth embankment. Actual construction cost \$435,083. Total P. L. 566 cost \$562,123.

COSTS AND BENEFITS

Total estimated project costs are \$933,261. The ratio of average annual benefits of structural measures \$38,710, to the average annual cost, \$28,967, is 1.5:1. Average annual damages will be reduced by 90 percent.

STATUS

The project was authorized for installation May 1963. The first construction contract was completed in November 1964 and project construction was completed in October 1965.

PROJECT BENEFITS

Structural measures produced flood prevention benefits of \$34,500 for a flood which occurred in September 1965.

PROJECTS COMPLETED

PECOS ARROYO WATERSHED

LOCATION

San Miguel County in north-eastern New Mexico. Adjacent to city of Las Vegas. Tributary to Gallinas River, a tributary of the Pecos River.

SIZE

47,808 acres.

SPONSORS

Gallinas-Telcolote Soil Conservation District. Mora-San Miguel Soil Conservation District.

PROBLEMS

Floodwater damage to highways, railroad, cropland, urban property in Las Vegas, irrigation facilities. Sediment damage to irrigation canals and deposition in Storrie Lake.

LAND TREATMENT

Range proper use, seeding of grass, stripcropping, terracing, erosion control structures. Estimated cost \$24,310.

STRUCTURAL MEASURES

One floodwater retarding structure. The structure will control the flood runoff from a 50-year flood event and will have a total floodwater and sediment capacity of 1,613 acre-feet. Earth embankment is 136,863 cubic yards. Actual construction cost \$106,322. Total P. L. 566 cost \$145,493.

COSTS AND BENEFITS

Total estimated project cost \$142,045. Ratio of average annual benefits, \$5,342, to the average annual cost, \$4,551, is 1.2:1. Average annual damages will be reduced by 59 percent.

STATUS

The watershed was approved for installation June, 1959. Contract for construction was let in September, 1964, and construction was completed in June, 1965. A contract was awarded in June, 1967 for seeding the embankment and adjacent areas to grass.

PROJECTS APPROVED FOR INSTALLATION

PROJECTS APPROVED FOR INSTALLATION

HACKBERRY DRAW WATERSHED

LOCATION

Southeastern New Mexico adjacent to the city of Carlsbad in Eddy County. Tributary to Dark Canyon, a tributary of the Pecos River.

SIZE

13,760 acres.

SPONSORS

Carlsbad Soil and Water Conservation District and Hackberry Draw Watershed District.

PROBLEMS

Flood damage to irrigated land, crops, farm improvements, roads and residential property.

LAND TREATMENT

Range proper use on the upland portion of the watershed. Measures to be installed on irrigated land are those which will make a contribution to the conservation and more efficient use of irrigation water.

STRUCTURAL MEASURES

Three floodwater retarding structures, 4 floodwater diversions (24,146 feet), 3,060 feet of outlet channel, 7 appurtenant structures including 4 drop structures, 2 flumes and 1 culvert. The structures will fully control the 50-year flood event. Total floodwater and sediment capacity is 1,614 acre-feet. The structures contain 272,450 cubic yards of earth embankment.

COSTS AND BENEFITS

Total estimated installation cost of the project is \$320,462. The ratio of average annual benefits, \$16,275, to the average annual cost of structural measures, \$13,600, is 1.2:1. The project will reduce present damages by 89 percent.

STATUS

A contract for construction of Sites 2 and 3 was awarded March 18, 1966. A contract for construction of Site 1 and the 4 diversions was awarded on March 27, 1967. The construction is scheduled to be completed in January 1968.

PROJECTS APPROVED FOR INSTALLATION

AVALON-ALACRAN WATERSHED

LOCATION

Southeastern New Mexico adjacent to city of Carlsbad in Eddy County. Includes community of La Huerta. Tributary to the Pecos River but none of the arroyos have channels to the river.

SIZE

8,640 acres.

SPONSORS

Carlsbad Soil and Water Conservation District and Carlsbad Irrigation District.

PROBLEMS

Flood damage once every two or three years by overland flow and ponding. Damage to irrigated cropland, homes, roads and railroads, irrigation canals and ditches, schools, churches, businesses.

LAND TREATMENT

Range proper use on the upland area. Measures for conservation and efficient use of irrigation water such as land leveling, irrigation water management, irrigation ditch and canal lining.

STRUCTURAL MEASURES

Two floodwater retarding structures, 2 channels (5,511 feet), 2 diversions (9,700 feet) and 2 grade stabilization structures and 1 flume. Total floodwater and sediment capacity is 497 acre-feet. The structures will contain 77,928 cubic yards of earth embankment.

COSTS AND BENEFITS

Total estimated installation cost is \$120,248. The ratio of average annual benefits of structural measures, \$6,390, to average annual cost, \$4,558, is 1.26:1. The project will reduce present damages by 93 percent.

STATUS

The work plan was completed in June 1964 and the project was approved for installation in August 1964. Land rights work maps have been completed and sent to the sponsors.

PROJECTS APPROVED FOR INSTALLATION

CASS DRAW WATERSHED

LOCATION

Midway between city of Carlsbad and Carlsbad Caverns National Park in Eddy County. Tributary to the Pecos River but has no through channel to the river.

SIZE

31,494 acres.

SPONSORS

Carlsbad Soil and Water Conservation District and Carlsbad Irrigation District.

PROBLEMS

Flood damage to 2,250 acres of irrigated cropland, irrigation canal, U. S. Highway 285, AT & SF Railroad, irrigation and drainage ditches, and county roads. Occasional damage in town of Loving.

LAND TREATMENT

Range proper use, irrigation water management, land leveling, irrigation ditch lining. Estimated installation cost \$39,100.

STRUCTURAL MEASURES

Two floodwater retarding structures, 1 diversion of 2,890 feet, 15,010 feet of outlet channel, 5,410 feet of levee and 8 grade stabilization structures. Total floodwater and sediment capacity is 2,911 acre-feet. The structures contain 347,932 cubic yards of earth embankment.

COSTS AND BENEFITS

Total estimated installation cost \$346,848. Structural measures cost \$307,748. Ratio of average annual benefits \$12,950 to average annual cost of structural measures \$11,215 is 1.2:1. Damages for a flood with an occurrence of once in 100 years will be reduced 100 percent.

STATUS

The work plan was completed in April 1964 and the project was approved for installation in May 1965. Land rights work maps have been completed and sent to the sponsors. Geologic site investigations were started in June 1967 and construction is scheduled to start in January 1968.

PROJECTS APPROVED FOR INSTALLATION

ANTHONY ARROYO WATERSHED

LOCATION

Dona Ana County, New Mexico and El Paso County, Texas. Tributary to the Rio Grande although it has no through channel to the river. Town of Anthony is within the watershed.

SIZE

4,032 acres.

SPONSORS

Elephant Butte Irrigation District.

PROBLEMS

Floodwater and sediment damage to about 1,075 acres of irrigated cropland, businesses and residences in Anthony, irrigation facilities, roads and streets.

LAND TREATMENT

Range proper use is the only planned measure for range lands. Irrigation water management, irrigation land leveling, lining of farm irrigation ditches, and small irrigation structures will be installed on the irrigated land.

STRUCTURAL MEASURES

One floodwater retarding structure, 740 feet of outlet channel and one grade stabilization structure. The structure will fully control the 100-year flood event and will be fully effective for 100 years. Total floodwater and sediment capacity is 592 acre-feet. The structure will contain 200,483 cubic yards of earth embankment.

COSTS AND BENEFITS

Estimated total project costs are \$158,630. The project will reduce present damages by about 86 percent. The ratio of the average annual benefits, \$7,988, to the average annual cost, \$5,035, is 1.6:1.

STATUS

The work plan was completed in April, 1965. The project was approved for installation May 27, 1965.

PROJECTS APPROVED FOR INSTALLATION

CROW AND BROAD CANYONS AND PLACITAS ARROYO WATERSHED

LOCATION

Tributaries to the Rio Grande in Dona Ana and Sierra Counties of southwestern New Mexico. The town of Hatch and the settlement of Placitas are within the watershed.

SIZE

137,932 acres.

SPONSORS

Caballo Soil and Water Conservation District; Elephant Butte Irrigation District.

PROBLEMS

Floodwater damage to irrigated cropland, highways, a railroad, irrigation facilities and the town of Hatch. Also contributes to flood volumes downstream on the Rio Grande. Sediment deposition in the channel of the Rio Grande is the major problem. This sediment must be removed by the U. S. section of the International Boundary & Water Commission in order to maintain the designed channel of the Rio Grande.

LAND TREATMENT

Most of the needed land treatment measures have been installed. Because of climatic and topographic conditions, it is not feasible to carry out intensive treatment of the upland area. Estimated cost of installing the land treatment measures is \$67,793, which is a non-Federal cost.

STRUCTURAL MEASURES

The plan includes 8 floodwater retarding structures, 2,000 feet of floodwater diversion, 6 grade stabilization structures and enlarging the emergency spillway of a B. L. M. retarding structure. The structures are designed to be fully effective for 100 years. Total floodwater and sediment capacity is 21,052 acre-feet. The structures will contain 3,359,061 cubic yards of earth embankment. Total estimated cost of structural measures is \$2,928,775, of which \$37,890 is local cost and \$2,890,885 is P. L. 566 cost.

COSTS AND BENEFITS

Total estimated cost of the project is \$2,996,568. Flood damages will be reduced by about 98 percent and sediment damages by 89 percent. The ratio of average annual benefits \$187,163 to the average annual cost, \$108,077, is 1.7:1.

STATUS

The work plan was completed in January 1966 and the project was approved for installation in August 1966. Land rights work maps have been completed and sent to the sponsors.

PROJECTS BEING PLANNED

PROJECTS BEING PLANNED

SIBLEY, GREEN, JARALOSA AND CANDLER ARROYOS WATERSHED

LOCATION

Tributaries to the Rio Grande in Dona Ana and Sierra Counties of southwestern New Mexico.

SIZE

120,876 acres.

SPONSORS

Caballo Soil and Water Conservation District. Elephant Butte Irrigation District.

PROBLEMS

Flood damage to 290 acres of irrigated cropland, irrigation ditches, U. S. Highway 85 and the AT & SF Railroad. Also contributes to floods downstream on the Rio Grande. Sediment deposition in the channel of the Rio Grande is the major problem. This sediment must be removed by the U. S. section of the International Boundary and Water Commission in order to maintain the designed channel of the Rio Grande.

LAND TREATMENT

Emphasis will be on range proper use on the upland portion of the watershed. Treatment on irrigated land will consist of measures for the conservation and more efficient use of irrigation water. Total estimated cost of land treatment is \$120,012 of which \$109,530 will be paid by other than P. L. 566 funds.

STRUCTURAL MEASURES

Structural measures will consist of 7 floodwater retarding structures and associated channel stabilization measures. The structures will have an aggregate capacity of 25,962 acre-feet for floodwater detention and sediment storage. The structures will contain 4,212,927 cubic yards of earth embankment. Total estimated cost \$3,367,314 of which the local share is \$20,100 and the P. L. 566 share is \$3,347,214. The structures will control the runoff from 177.2 square miles which is 99 percent of the watershed above the benefited area.

COSTS AND BENEFITS

Total estimated cost of the project \$3,487,326. P. L. 566 \$3,357,696; other \$129,630. Flood damages will be reduced by 98 percent and sediment damage by 82 percent. The ratio of average annual benefits accruing to structural measures, \$199,935, to the average annual cost, \$115,806, is 1.7:1.

STATUS

The tentative work plan has been completed and the work plan agreement has been transmitted to the sponsors for signing.

PROJECTS BEING PLANNED

CORRALES WATERSHED

LOCATION

Bernalillo and Sandoval Counties. Arroyos are tributary to Rio Grande but do not have channels to the river. Community of Corrales is within the watershed. Adjacent to Albuquerque.

SIZE

85,000 acres.

SPONSORS

Central Rio Grande Soil and Water Conservation District. Jemez Soil and Water Conservation District. Corrales Watershed District.

PROBLEMS

Floodwater and sediment damage to agricultural land, homes, building and irrigation facilities. Development on the upland area will increase the flood hazard in future years.

LAND TREATMENT

Upland treatment of range land will include range proper use, deferred grazing, stock water developments and fencing. Measures to be installed on irrigated cropland will be for the conservation and more efficient use of irrigation water. Estimated cost of installing land treatment measures is \$122,038.

STRUCTURAL MEASURES

One floodwater retarding structure with a total capacity for floodwater detention and sediment storage of 4,053 acre-feet. Earth embankment 726,236 cubic yards. Three floodwater diversions 17,426 and 1,000 feet of channel improvement. Total structure cost is \$1,200,076 of which \$1,119,313 is P. L. 566 cost and \$80,763 will be from other funds.

COSTS AND BENEFITS

Total project costs \$1,322,114; \$1,131,284 P. L. 566 and \$190,830 other costs. The ratio of average annual benefits from structural measures, \$74,262, to average annual cost, \$51,006, is 1.5:1.

STATUS

Tentative work plan is being revised.

PROJECTS BEING PLANNED

RUNNING WATER DRAW WATERSHED (New Mexico Portion)

LOCATION

Eastern New Mexico in Curry County north of Clovis. Tributary to Rio Blanco. Watershed extends into Parmer County, Texas.

SIZE

240,000 acres. 126,000 acres in New Mexico.

SPONSORS

Central Curry Soil and Water Conservation District. Parmer County Soil Conservation District, Texas. City of Clovis. Curry County Commission.

PROBLEMS

Flood damages to crop and pasture, irrigation facilities, fences, roads, bridges and urban property in the city of Plainview, Texas. The sponsors are interested in one or more developments for recreation.

LAND TREATMENT

Emphasis will be on those measures which will improve soil and cover conditions and reduce erosion and flood damages.

STRUCTURAL MEASURES

The New Mexico portion of the project will include one floodwater retarding structure and one structure for floodwater detention and recreation water storage. Both structures will detain the runoff from the one percent chance flood event and will store the estimated 100-year sediment volume. The total combined capacity of the 2 structures is 15,179 acre-feet. Recreation water storage in Site 3 is 3,000 acre-feet. The structures will contain an estimated 618,528 cubic yards of earth embankment.

COSTS AND BENEFITS

Total estimated cost of structural measures is \$979,254.

STATUS

All planning in the New Mexico portion of the watershed has been completed.

PROJECTS BEING PLANNED

SEBASTIAN MARTIN-BLACK MESA WATERSHED

LOCATION

Rio Arriba County in north-central New Mexico. The numerous arroyos in the watershed are tributary to the Rio Grande. Towns of Riverside and Espanola are adjacent to the watershed.

SIZE

103,040 acres.

SPONSORS

Espanola Valley Soil and Water Conservation District. Upper Rio Grande Watershed District.

PROBLEMS

Floodwater and sediment damage to irrigated cropland, and irrigation facilities and sediment deposition in arroyo channels, the Rio Grande and a proposed reservoir downstream.

LAND TREATMENT

Total estimated cost of installing land treatment measures is \$698,933. Installation of land treatment on private lands is estimated to cost \$516,851. Installation of measures on Federal land administered by the Bureau of Land Management is estimated to cost \$138,107 and land treatment on the National Forest will amount to \$43,975.

STRUCUTRAL MEASURES

Thirteen floodwater retarding structures, 8,650 feet of floodwater diversion, 5 sediment control structures, 2,610 feet of channel and 3 grade stabilization structures are planned. The 13 floodwater retarding structures will have a total capacity of 6,252 acre-feet for sediment storage and floodwater detention. The structures will contain 2,474,877 cubic yards of earth embankment.

COSTS AND BENEFITS

Total estimated costs for installing structural measures is \$2,453,724 of which \$2,425,900 is P. L. 566 cost and \$27,824 is other cost. The ratio of average annual benefits from structural measures \$160,402, to average annual cost \$86,432 is 1.9:1.

STATUS

The preliminary work plan has been completed.

PROJECTS BEING PLANNED

TUCUMCARI DRAW WATERSHED

LOCATION

Adjacent to the city of Tucumcari in Quay County. Arroyos enter Tucumcari Lake which has no outlet.

SIZE

10,781 acres.

SPONSORS

Canadian River Soil and Water Conservation District, City of Tucumcari. Arch-Hurley Conservancy District.

PROBLEMS

Flood damage to irrigated cropland, irrigation facilities and highway. Fluctuation of Tucumcari Lake prevents development of adjacent land and creates highwater table under adjacent land. Present instability prevents development of potential.

LAND TREATMENT

Not determined.

STRUCTURAL MEASURES

Three floodwater retarding structures, one multiple purpose structure, 7 floodwater diversions, 3 drains, 3 pumping units, one channel and 2 grade stabilization structures are planned. The 3 floodwater retarding structures and the multiple purpose structure will have a total capacity of 4,788 acre-feet for sediment storage, recreation storage and floodwater detention.

COSTS AND BENEFITS

Estimated cost of installing the structural measures is \$1,527,814 of which the P. L. 566 share is \$1,178,652 and the local cost is \$349,162. The estimated average annual benefits including recreation benefits are \$148,642 and the average annual cost is \$80,007. Benefit cost ratio is 1.9:1.

STATUS

The preliminary work plan was completed in April 1967.

PROJECTS BEING PLANNED

LAUSON-BREEDLOVE WATERSHED

LOCATION

Dona Ana County in southwestern New Mexico. Tributary to the Rio Grande although none of the arroyos have channels to the river.

SIZE

6,935 acres.

SPONSOR

Elephant Butte Irrigation District.

PROBLEMS

Floodwater and sediment damage to irrigated cropland, irrigation facilities, and roads.

LAND TREATMENT

Not determined.

STRUCTURAL MEASURES

Ten floodwater retarding structures, diversions, outlet channels and grade stabilization structures are being planned.

COSTS AND BENEFITS

Not determined.

STATUS

A contract has been awarded for preliminary design and cost estimates for 6 of the proposed floodwater retarding structures.

PROJECTS BEING PLANNED

COTTONWOOD-WALNUT CREEK WATERSHED

LOCATION

Just north of city of Artesia in Chaves and Eddy Counties, southeastern New Mexico. Tributary to the Pecos River.

SIZE

228,326 acres.

SPONSORS

Central Valley, Penasco and Hagerman-Dexter Soil and Water Conservation Districts. Cottonwood-Walnut Creeks Watershed District.

PROBLEMS

Flood damage to irrigated cropland, highways and railroad.

LAND TREATMENT

Not determined.

STRUCTURAL MEASURES

Twelve floodwater retarding structures and one multiple purpose structure for flood prevention and recreation are being planned. The plan will also include several diversions and about 10 miles of channels.

COSTS AND BENEFITS

Not determined

PROJECTS BEING PLANNED

TRUJILLO, MONTOYA, TIERRA BLANCA AND RINCON ARROYOS WATERSHED

LOCATION

Dona Ana and Sierra Counties.
Tributaries to the Rio Grande.

SIZE

157,480 acres.

SPONSORS

Caballo Soil and Water Conservation District. Elephant Butte Irrigation District.

PROBLEMS

Floodwater damage to irrigated cropland, homes and farmsteads, irrigation facilities, highways, bridges, and the AT & SF Railroad. Sediment deposition in the channel of the Rio Grande is the principal problem of the watershed.

LAND TREATMENT

Range proper use and associated treatment of range lands. Measures for more efficient use and conservation of water on irrigated land.

STRUCTURAL MEASURES

The preliminary investigation proposed 7 floodwater retarding structures and associated structures.

COSTS AND BENEFITS

The preliminary investigation estimated total cost of structural measures at \$1,422,200. The estimated average annual cost was \$52,000 and the estimated average annual benefits were \$64,650.

STATUS

Planning has been temporarily delayed on this project.

PROJECTS BEING PLANNED

EAGLE-TUMBLEWEED DRAWS WATERSHED

LOCATION

Eddy and Chaves Counties in the Vicinity and including the City of Artesia. Tributary to the Pecos River.

SIZE

182,800 acres.

SPONSORS

Central Valley and Penasco Soil and Water Conservation Districts, and city of Artesia.

PROBLEMS

Flood damage to agricultural lands and urban property in the city of Artesia.

LAND TREATMENT

Range proper use and associated measures on rangeland and measures for the conservation and more efficient use of water on irrigated cropland.

STRUCTURAL MEASURES

One floodwater retarding structure and about 4 miles of channel are being planned.

COSTS AND BENEFITS

Not determined.

STATUS

An engineering contract has been awarded for preliminary design and cost estimates of the proposed structural measures.

PROJECTS BEING PLANNED

T OR C-WILLIAMSBURG ARROYOS WATERSHED

LOCATION

Southwestern New Mexico in Sierra County. City of Truth or Consequences is within the watershed. 8 - 10 arroyos tributary to the Rio Grande.

SIZE

19,048 acres.

SPONSORS

Sierra Soil and Water Conservation District, City of Truth or Consequences.

PROBLEMS

Flood damage to urban property in the city and adjacent cropland.

LAND TREATMENT

Climatic and topographic conditions are not favorable for land treatment other than range proper use.

STRUCTURAL MEASURES

8-10 floodwater retarding structures and associated outlet channels.

COSTS AND BENEFITS

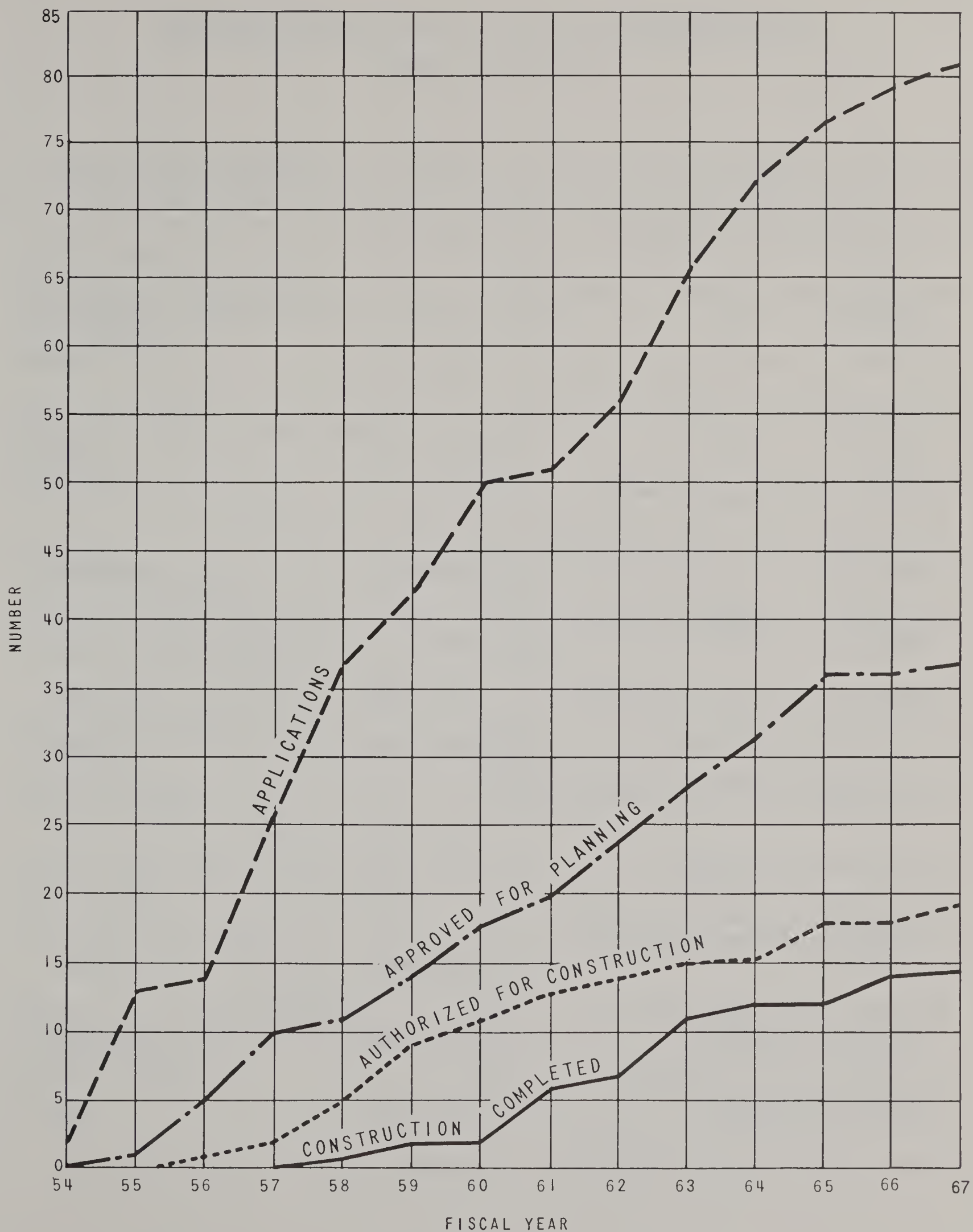
Costs and benefits have not been estimated.

STATUS

Authorized for planning December 1966.

PROGRAM SUMMARIES

Figure 1
STATUS OF THE SMALL WATERSHED PROGRAM IN NEW MEXICO
JULY 1, 1967



WATERSHED PROTECTION AND FLOOD PREVENTION PROJECTS

STATISTICAL SUMMARY

ITEM	UNIT	FISCAL YEAR 1967	TO DATE
Applications for Assistance	No.	2	81
Watershed Area Included in Applications	Acres	320,261	7,382,715
Watersheds Authorized for Planning	No.	1	37
Watersheds Authorized for Construction	No.	1	19
Watershed Projects Completed	No.	-	14
Total Construction Cost (Completed Projects)	Dollars	-	3,370,545
Floodwater Retarding Structures Completed	No.	-	52
Floodwater Diversions Completed	Lin. Feet	-	121,384
Outlet Channels Completed	Lin. Feet	-	39,840
Grade Stabilization Structures Completed	No.	-	41
Debris Basins Completed	No.	0	3
Total Detention Capacity of Completed Structures (Floodwater & Sediment)	Acre-Feet	-	27,703
Volume of Earth Embankment in Completed Structures	Cu. Yards	-	5,226,043
Area Controlled by Completed Structural Measures	Sq. Miles	-	476
Total Area in Completed Projects	Acres	-	724,317

LAND TREATMENT MEASURES INSTALLED ON WATERSHED PROJECTS

ITEM	UNIT	F. Y. 1967	TO DATE
Brush and Weed Control	Acres	-	3,223
Chiseling and Subsoiling	Acres	-	2,720
Conservation Cropping System	Acres	7,516	25,210
Crop Residue Use	Acres	324	6,866
Debris Basins	No.	-	5,374
Dikes and Levees	Ft.	-	936,057
Irrigation Ditch & Canal Lining	Ft.	2,182	45,771
Diversions	Ft.	1,000	240,665
Farm Ponds	No.	-	698
Irrigation Field Ditch	Ft.	1,859	300,771
Floodways	Ft.	-	12,773
Grassed Waterways	Acre	-	28,751
Irrigation Pipeline	Ft.	2,599	10,188
Irrigation Water Management	Acres	2,570	6,117
Irrigation Land Leveling	Acres	48	2,431
Pasture & Hayland Planting	Acres	11	2,344
Pipeline, Livestock	Ft.	15,981	77,011
Pitting	Acres	-	1,200
Range Proper Use	Acre	64,446	346,459
Range Renovation	Acre	-	20,299
Range Seeding	Acre	-	6,211
Range Rotation-Deferred Grazing	Acre	-	7,215
Stock Trails	Ft.	-	89,615
Streambank Protection	Ft.	-	19,000
Stream Channel Improvement	Ft.	-	96,082
Stream Channel Stabilization	Ft.	-	6,600
Structures for Water Control	No.	109	779
Terrace, Gradient	Ft.	-	501,600
Terrace, Level	Ft.	-	5,280
Wells	No.	-	199

STATUS OF APPLICATIONS FOR ASSISTANCE SUBMITTED UNDER PUBLIC LAW 566
PROJECT CONSTRUCTION COMPLETED

JULY 1967

NO. 1/ WATERSHED		COUNTY	AREA (Acres)	APPL. APPR. BY STATE ENGR.	AUTH. FOR PLNG.	WORK PLAN COMPL.	APPR. FOR INST- ALLN.	PROJ. CONST. COM- PLET- ED	FEDERAL 2/ PROJECT COST (Do1.)	NON-FED. 2/ PROJECT COST (Do1.)	TOTAL 2/ PRO- JECT COST (Do1.)
3	Dona Ana Arroyos	Dona Ana	6,950	1-55	7-55	4-56	7-56	2-58	115,195	51,672	166,867
1	Hatch Valley Arroyos	Sierra-Dona Ana	14,521	11-54	1-55	10-55	6-56	9-58	137,261	47,724	184,985
31	Caballo Arroyos	Sierra-Dona Ana	7,680	12-57	1-58	5-58	5-58	9-60	280,293	6,150	286,443
2	Upper Rio Penasco	Otero	128,000	11-54	7-55	5-57	6-57	11-60	313,437	45,300	358,737
4	Zuber Draw	Chaves	115,840	2-56	2-56	10-57	3-58	11-60	365,196	158,492	523,688
13	Tramperos Creek	Union-Harding	136,320	5-55	3-56	4-58	7-58	3-61	338,355	148,994	487,349
24	Prop Canyon & Tributaries	Valencia	19,162	3-57	6-57	10-58	10-58	9-61	191-123	26,725	217,848
6	Santa Cruz River	Rio Arriba-									
		Mora-Santa Fe	117,180	1-55	10-56	4-59	8-59	9-62	498,198	24,025	522,223
33	Fillmore Arroyos	Dona Ana	16,292	4-58	10-59	3-61	3-61	10-62	272,711	7,310	280,021
27	Tortugas Arroyo	Dona Ana	15,584	10-57	2-59	10-59	4-61	11-62	332,141	10,500	342,641
29	Upper Gila Valley										
	No. 1	Grant	27,000	7-57	9-58	3-60	8-60	3-63	340,972	12,490	353,462
7	Salt peter Creek	Colfax	32,320	1-55	6-57	4-59	4-59	6-64	209,441	48,240	257,681
15	Pecos Arroyo	San Miguel	47,808	9-56	6-57	4-59	6-59	6-65	118,855	23,190	142,045
38	Apache-Brazito-Mesquite	Dona Ana	39,660	11-58	12-61	11-62	5-63	10-65	643,857	289,404	933,261
TOTAL			724,317	4,157,035 900,216 5,057,251							
PROJECTS APPROVED FOR INSTALLATION											
45	Hackberry Draw	Eddy	13,760	9-59	4-61	4-62	6-62	-	283,682	36,650	320,462
44	Avalon-Alacran	Eddy	8,640	9-59	12-61	6-64	8-64	-	91,720	28,528	120,248
43	Cass Draw	Eddy	32,000	9-59	12-61	4-64	5-65	-	273,191	73,657	346,848
40	Anthony Arroyo	Dona Ana	4,032	6-62	1-63	4-65	5-65	-	135,140	23,490	158,630
41	Crow, Broad & Placitas	Dona Ana, Sierra	137,932	11-58	4-63	1-66	8-66	-	2,890,885	105,683	2,996,568
TOTAL			196,364	3,672,618 267,908 3,942,756							

PROJECTS AUTHORIZED FOR PLANNING

NO. <u>1</u> /	WATERSHED	COUNTY	AREA (Acres)	APPL. APPRVD. BY STATE ENGR.	AUTH. FOR	
					PLNG.	PLNG.
39	Lauson-Breedlove	Dona Ana	6,935	12-58	4-63	
47	Sebastian Martin - Black Mesa	Rio Arriba	103,040	11-59	8-63	
54	Corrales	Bernalillo-Sandoval	85,000	11-61	11-63 (Prel. Work Plan Complete)	
64	Sibley, Green, Jaralosa & Candler Arroyos	Dona Ana-Sierra	120,876	3-63	2-64 (Prel. Work Plan Complete)	
57	Tucumcari Draw	Quay	10,781	7-62	10-64	
52	Cottonwood-Walnut Creek	Eddy-Chaves	228,326	8-61	6-64	
55	Running Water Draw 3/	Curry	126,000 (N.Mex.)	6-62	1-65	
66	Trujillo, Montoya, Tierra Blanca & Rincon Arroyos	Dona Ana-Sierra	157,480	5-63	5-65	
72	Eagle-Tumbleweed Draws	Chaves-Eddy	182,800	6-64	5-65	
70	T or C-Williamsburg	Sierra	19,048	4-64	12-66	
TOTAL			1,040,286			

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WORK PLAN PREPARATION DISCONTINUED

					PLNG. SUSPND. OR TERMD.	
					PLNG.	PLNG.
36	Lemitat-Polvadera	Socorro	30,980	6-58	10-59	Terminated
10	Bloomfield Arroyo	San Juan	9,200	4-60	11-60	Terminated
17	Upper Dry Cimarron	Union-Colfax	113,800	11-56	9-58	Suspended
16	North Dry Cimarron	Union-Las Animas				
		Colorado	238,000	1-57	12-59	Suspended
14	South Dry Cimarron	Union	212,244	3-56	12-59	Suspended
5	Pojoaque Creek	Santa Fe	157,220	1-55	10-56	Terminated
50	Eagle Creek	Lincoln	36,742	6-60	4-63	Terminated
25	Upper Frisco	Catron	195,640	5-57	5-62	Terminated
TOTAL			993,826			

TOTAL

993,826

PRELIMINARY INVESTIGATION OR FIELD EXAMINATION COMPLETE

PROJECTS CONSIDERED FEASIBLE

NO. 1/ WATERSHED	COUNTY	AREA (Acres)	APPL. APPR.		PREL. INVEST. REPORT	PRIORITY		REMARKS
			BY STATE	ENGINEER		BY STATE	ENGR.	
48 Pajarito Arroyos	Bernalillo	11,200	2-60		7-62			
42 Gary-Winder-Haynor	Dona Ana	3,870	3-59		3-63			
53 Upper Valley Arroyos	Dona Ana-Sierra	10,940	10-61		3-63			
62 Sandias	Sandoval	59,306	1-63		8-63		7-64	
60 Embudo Creek	Taos-Rio Arriba	203,372	1-63		6-64			
30 Upper Mora River	Mora	121,882	10-57		6-64			
32 Leasburg Arroyos	Dona Ana	12,720	4-58		3-64			
59 La Union Arroyos	Dona Ana	4,817	12-62		3-64			
35 Belen	Valencia	69,760	4-58		3-64			(Feasible for Agr. Water Management)
65 Little Rio Grande	Taos	128,038	4-63		6-64			
69 Cornudas-North Draws	Otero, New Mex.							
	Hudspeth, Tex.		8-63					
67 Espanloa-Rio Chama	Rio Arriba	146,850	7-63		9-64			
49 Ojo Caliente	McKinley-Valencia	30,410	2-60		12-64			(Feasible for Agr. Water Mgt.)
41 Central Lea	Lea	250,000	1-59					

TOTAL

1,053,165

CONSIDERED NOT FEASIBLE AT PRESENT

11 Middle Rio Penasco	Otero-Eddy	241,690	3-55		2-62			
9 North Spring River	Chaves	21,189	1-58		3-62			(Corps of Engrs. Project)
46 Alamo Arroyo	Lincoln	35,674	11-59		5-62			
58 Taos Creek	Taos	56,600	11-62		10-63			(Application Withdrawn 11-64).
22 Carrizo Creek	Union	250,000	2-57		8-63			
61 Carrizo Creek	Otero	16,300	1-63		10-63			

TOTAL

621,453

APPLICATIONS NEEDING FEASIBILITY INVESTIGATION

NO. 1/ 2	WATERSHED	COUNTY	AREA (Acres)	APPROVED BY STATE ENGINEER
8	Arroyo Grande	Taos	9,080	4-55
12	Lower Rio Penasco	Otero-Eddy	189,310	3-55
18	Cieneguilla Creek	Union	248,317	10-56
19	Carrizozo Creek	Union	133,000	11-56
20	Monia Creek	Union	139,776	11-56
21	Corrumpa Creek	Union	249,000	2-57
23	Alvillar Arroyos	Dona Ana	3,700	2-57
26	Perico Creek	Union	195,200	6-57
28	Turley-Deerman	Dona Ana	2,040	9-57
37	North Alameda	Dona Ana	9,330	7-58
51	Garita Creek	San Miguel-Guadalupe	50,000	11-60
68	San Cristobal	Taos	11,040	7-63
73	Vermejo River	Colfax	225,555	10-64
74	Hammond Conservancy District-San Juan		112,000	3-65
71	Chico Rico	Colfax, New Mexico	234,880	5-64
75	Silver City	Las Animas, Colorado		
34	San Mateo-Grants Canyon	Grant	18,600	4-65
63	Pole-Zuni Canyons	Mckinley-Valencia	205,000	5-58 (Applic. Amended 4-65)
76	Rio San Jose	Valencia	67,000	(Applic. Amended 1-65)
77	Bear Creek	Valencia-McKinley	205,015	5-65
78	San Miguel Arroyos	Grant	106,240	6-65
79	Hampton, Aztec, School, Williams & Estes Arroyo	Dona Ana	3,960	11-65
80	Ruidoso	San Juan	15,000	12-65
81	Gallinas River	Lincoln-Otero	169,400	5-67
		San Miguel	150,861	2-67
	TOTAL		2,753,304	

1/ Number assigned by SCS.

2/ Work plan estimates.

3/ Administrative responsibility with other State.



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